

(57) Abstract

The invention relates to a process for producing simultaneously food-grade and fodder-grade phosphoric acid by crystallizing phosphoric acid hemihydrate, $\text{H}_3\text{PO}_4 \times 0.5 \text{ H}_2\text{O}$, from a prepurified feed acid, which is purified and crystallized with the help of the following steps,

a) after the step of froth-flotation of phosphate concentrate, the concentrate is directed to a strongly magnetic separation step in order to decrease the Mg ion amount,

b) the phosphate concentrate is leached in a mixture of sulfuric acid and phosphoric acid according to the wet process, the precipitated SO_4 and As ions are removed, and a silicon source is added in order to adjust the F/Si molar ratio to < 6 ,

c) the phosphoric acid is concentrated, the solids precipitate is removed, and the F ions are evaporated,

d) the feed acid obtained from step c, having a concentration of $> 58\% \text{ P}_2\text{O}_5$, solids concentration of $< 0.05\%$, Mg ion concentration of $< 1.5\%$, SO_4 ion concentration $< 1\%$, As ion concentration of $< 8 \text{ ppm}$ and F ion concentration of $< 0.2\%$, is crystallized at a steady crystal growth rate of $< 10 \mu\text{m}/\text{min}$, the temperature difference in the first crystallization being $< 17^\circ\text{C}$, and the crystals are washed with the undersaturated mother liquor of the subsequent recrystallization step,

e) the phosphoric acid crystallized in step d is melted, is diluted to a concentration of $< 63\% \text{ P}_2\text{O}_5$, seed crystals are added, and crystallization is carried out as in step d, the temperature difference being $< 8^\circ\text{C}$, and the crystals are washed with an undersaturated solution of phosphoric acid, and

f) optionally the phosphoric acid crystallized in step e is melted, is diluted to a concentration of $< 63\% \text{ P}_2\text{O}_5$, seed crystals are added, and crystallization is carried out as in step d, the temperature difference being $< 6^\circ\text{C}$, and the crystals are washed with an undersaturated washing solution prepared from product crystals.